Journal of Infrastructure, Policy and Development 2025, 9(1), 10899.
https://doi.org/10.24294/jipd10899

Article

The digital policies in the face of access and usage inequalities among young people in intermediate cities in Senegal: The case of Saint-Louis

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CITATION

Adjanohoun DS, Mbengue TP, Sow D. (2025). The digital policies in the face of access and usage inequalities among young people in intermediate cities in Senegal: The case of Saint-Louis. Journal of Infrastructure, Policy and Development. 9(1): 10899. https://doi.org/10.24294/jipd10899

ARTICLE INFO

Received: 13 December 2024
Accepted: 30 December 2024
Available online: 21 January 2025

Abstract: This contribution questions young people's access to digital networks at the scale of intermediate cities in Saint-Louis. Thus, it analyzes the prescriptions of digital actors responsible for the development of digital economy in relation with the orientations of the Senegal Digital 2025 strategy. This is a pretex to highlight the gaps between official political discourses and the level of deployment of digital infrastructures. The study highlights the need to repoliticize the needs of populations for broadband and very high-speed connections to promote local initiatives for youth participation in Saint-Louis. Indeed, datas relating to access and use of the Internet by young people reveal inequalities linked to household income, the disparity of infrastructure and digital equipment, and the discontinuity in neighborhood development, but also to the adaptability of the internet service marketed. Through urban and explanatory sociology mobilized through the approach of young people's real access to the Internet, our analyzes have shown at the scale of urban neighborhoods the impact of the actions recommended by those involved in the development of populations' access to Internet. The result is that the majority of young people are forced to access the Internet through medium-speed mobile networks.

Keywords: digital policies; inequalities in internet access; participation; infrastructure; young people; intermediate cities; Saint-Louis

1. Introduction

Making digital technology an opportunity with a contribution of 11% to GDP and a tool for strengthening participatory democracy by involving young urban residents, 46.8% of whom, aged between 15 and 24, are neither employed, nor studying, nor in training (ANSD, 2023), is a challenge in the face of the employment crisis and social changes brought about by ICTs.

Aware of the impact of digital technology on economic development, successive political regimes in independent Senegal have undertaken substantial initiatives that have resulted in significant progress in the ongoing digital transition across all sectors and at all levels. Noteworthy among these are the creation of the Digital Solidarity Fund, initiated by former Senegalese President Maître A. Wade (which, at the international level, aims to bridge the digital division between Northern and Southern countries), and the establishment of specialized agencies such as the Telecommunications and Postal Regulatory Authority (ARTP) responsible for

promoting the digital economy. In addition, the Digital Senegal 2025 Strategy, adopted in 2017 as part of the Plan Sénégal Emergent (the reference document for public policies in Senegal), envisions "digital technology for all and for all uses by 2025 in Senegal, with a dynamic and innovative private sector within a thriving ecosystem." To achieve and maintain its leadership position in West Africa ahead of Côte d'Ivoire, Senegal has equipped itself with a National Broadband and Ultra-Broadband Plan, featuring over 15,000 km of fiber optics and the landing of five submarine cables to ensure robust international connectivity.

The efforts made by the State through various political regimes have enabled the country to make significant progress in urban digital inclusion. Thus, Senegal occupies a leading position with a marked increase in the penetration rate of mobile networks and prepaid internet. However, ARTP 2023 datas indicate the rates and dynamics of mobile network coverage by the four operators present in the urban area: ORANGE with 12,322,863 lines and a quarterly growth of 0.38% in its line pool; Expresso with 3,728,736 lines, showing a quarterly increase of 0.20%; FREE with 5,363,273 lines, exhibiting a positive quarterly growth of 3.67%; and PROMOBILE (Senegal's virtual mobile network operator) with 498,926 active lines and a quarterly growth of 2.53% (ARTP Report, 2023). Regarding internet coverage and dynamics relative to the number of lines, mobile internet users (internet keys/mobile terminals) connected with 2G/3G/4G represent the largest share of the internet lines pool (96.78%), followed by fixed-line internet users, established at 19,212,229 lines (ADSL/fiber subscriptions), an increase of 6.33%, and Internet Service Providers (ISPs), estimated at 1234 lines in the second quarter of 2023 (ARTP Report, 2023).

Aligned with the strategic objectives of the International Telecommunication Union (ITU), such as universal connectivity and sustainable digital transformation, Senegal is also cited as a model in digital transformation through its commitment to the dematerialization of administrative procedures, the development of digital skills, and the employability of youth and women.

Despite its leadership position in digital technology within the sub-region, Senegal paradoxically experiences many digital inequalities, considered as "*a notable difference in the distribution of resources that some individuals or social groups directly suffer from. This difference is socially produced and leads to a hierarchy of positions within the social space (...)*" (Granjon et al., 2009) within and between urban neighborhoods in Saint-Louis, which is regarded as an intermediate city in this research.

Through these empirical observations, the digital inequalities identified at the scale of urban neighborhoods in Saint-Louis are associated with both disparities related to the coverage of digital networks, household income and the harmful consequences of poor urban governance in the 300-year-old city. These findings were derived from an analysis of the social reality of digital practices among young urban residents aged 18 to 24, surveyed within their social and family structures in the neighborhoods of Saint-Louis. Playful and deeply embedded in social networks, youth digital use remains basic, according to empirical observations. This phenomenon is explained by predominantly mobile internet access, which is not well-suited to more complex digital practices—a hypothesis justified by the digital ecosystem (digital private companies, digital solution and support companies, etc.) prevailing in the city

of Saint-Louis. Almost non-existent and still not advanced enough to drive the development of the digital economy as recommended by digital policies, the State of Senegal needs to strengthen public digital infrastructure to democratize access via fiber optics, which is still modest and even very weak, ensuring access to broadband and ultra-broadband connectivity.

This contribution aims at questioning digital policies and the mechanisms in place to reinforce digital inclusion in intermediate cities in Senegal. Specifically, in the urban neighborhoods of Saint-Louis, the study analyzes youth access to digital technology at the household level, identifying both inequalities and variables that account for these disparities.

2. Materials and methods

This article provides a critical analysis of the level of access and inequalities related to the state of digital network coverage in relation with the strategic orientations of Senegal's Digital Public Policies. In this regard, it attempts to propose, based on empirical datas a matrix that highlights the relationship between digital access, household income, and the spatial identity of the households to which the surveyed youth belong in the neighborhoods of Saint-Louis.

In addition to the described objectives, this paper aims to discuss the goal of developing the digital economy, heavily emphasized in political discourse, as well as open and affordable access to networks and digital services in intermediate cities. These are the two main axes of digital policies implemented by the Plan Sénégal Emergent (PSE2). Their impact must be examined, particularly in terms of strengthening access to and the quality of public and private digital services, reducing inequalities heightened by digital disparities related to the distribution of infrastructure (BTS), and household income levels within urban neighborhoods in Saint-Louis. In relation with the research objectives, this article justifies the choice of the "real access to digital networks" approach as an analytical model. The value of this paradigm is that it contrasts real access (city level) with official global access (national level) concerning policy orientations to better identify and address digital inequalities. Thus, it allows us to measure and address the research problem at hand.

Unlike global access, which masks and conceals the digital planning issues within African cities, the study highlights these inequalities and explores potential pathways and solutions for affordable and adapted access in secondary cities. In other words, this research raises two paradoxes that need to be elucidated. In the other hand, it questions the coverage of secondary cities with public digital infrastructure in one of the countries best connected by submarine fiber optic cables (SAT-3, ACE, ATLANTIS-2, SHARE, and 2Africa). In the other hand, it investigates the digital access of young people, primarily through mobile networks, a finding supported by empirical research datas.

In the field, the research specifically examines the access and usage patterns of young people (units of observation) aged 18 to 24, at the household level (structure of observation), within the urban neighborhoods of the city of Saint-Louis, located in the norhwest of Senegal, facing the Atlantic Ocean. As a colonial city established by Europeans in 1659, it served as the capital of Senegal until 1958. This former colonial

city, known for its years of glory, is now a regional capital that inspires great hopes due to its potential to spread the development of the digital economy in surrounding cites. When examining the urban context, Saint-Louis reveals disparities and inequalities that suggest it is not homogenous, indicating distinct living standards between residents of the working-class and residential neighborhoods studied. This observation directly impacts the population's, particularly young people's, access to commercial and social services. Considered the most representative category of Senegal's population, young people constitute the largest segment of the population at the national level as well as in the city of Saint-Louis, accounting for 209732 individuals (ANSD, 2013) within the urban population. Through the hypothetico-deductive approach, the field survey involved questioning 549 young people using a questionnaire developed by a multidisciplinary team of sociologists, geographers, and telecommunications engineers. Accordingly, five analytical variables were identified and operationalized through dimensions identified in existing scientific literature. The variables identified are as follows:

- Geographic and social identification of the surveyed youth (inherent to any enumeration to situate the observation unit);
- Access to infrastructures and social usage in the city of Saint-Louis;
- Youth access to digital networks;
- Youth usage of digital networks;
- Digital governance.

Next, the various explored dimensions (level of infrastructure coverage, spatial, social, and economic dimensions related to youth access to digital technologies, social and professional usage, and the level of demand for broadband and ultra-broadband connections at the neighborhood level, governance gaps in digital policies, resistance and adaptation, safety and security) were converted into quantitative and qualitative measurement indicators.

Regarding the distribution of the 549 young people representing the target population surveyed, we coped with stratified random sampling. This decision was motivated by two factors: giving all eligible young people the chance to be surveyed and accounting for the social and urban morphology of the neighborhoods (residential, peripheral, or popular) represented by different strata (neighborhoods) and their unequal demographic weight. Additionally, various criteria were established as paramount for selecting the subjects who composed the sample. Several draws were carried out by stratum based on population and gender distribution in each neighborhood using datas from the 2013 national census of Senegal (RGPHAE-2013-ANSD).

Table 1 allows us to distribute the subjects interviewed according to the stata in the urban neighborhoods of Saint-Louis. In this sample, 45.9% are young girls, while 54.1% are young boys, indicating a slight male predominance in the age group studied. In addition to the draws by district, a distance of two steps (jump of 02 houses) is established between households for a good meshing of the units surveyed (young people) on the spatial level in the strata (districts) and the sub-strata (sub-districts). This research aims at questioning the access of young people aged 18 to 24 through their use of digital technology at the scale of intermediate cities and across households

and urban districts. The field surveyed was carried out using the Kobotoolbox/Kobocollect software, which simultaneously manages the raw datas. The empirical datas were therefore processed statistically using IBM SPSS Statistics version 24 software. The added value of such an approach lies in the identification of indices to fuel the scientific debate on the real impact of digital public policies in intermediate cities such as Saint-Louis in Senegal.

Table 1. distribution of units (young people aged 18 to 24) surveyed in the 7 neighborhoods investigated.

Neighborhoods	Men	Women	Population	%Men	%Women	%Population
Bango Nord	2137	1131	3269	65%	35%	3%
Bango Sud	2529	2173	4703	54%	46%	5%
Dakk Guet Ndar	4687	5208	9895	47%	53%	10%
Goxu Mbacc	8738	9412	18150	48%	52%	18%
Ile Nord	1535	1503	3038	51%	49%	3%
Cité Vauvert	1366	1350	2717	50%	50%	3%
Ndiolofène Nord	3121	2938	6050	51%	49%	6%
Ndiolofène sud	1678	1602	3280	51%	49%	3%
Pikine bas Sénégal	7016	7291	14308	49%	51%	14%
Pikine Sor Daga	5489	5040	10529	52%	48%	10%
Pikine sor Diagne	4802	4282	9184	52%	48%	9%
Pikine table waalo	8975	8454	17429	51%	49%	17%
	52064	50484	102552			

Source: RGPHAE-ANSD data, 2013.

3. Results

The results of the investigations of this research are presented in two blocks. The first block reports on the level of access of young people to digital technology through the Internet market, by analyzing the limits of the development of cable connection. This part will be completed by the presentation of the mapping of the mobilized internet that allows most young people aged 18 to 24 to connect in urban areas in Senegal. Under the report, the second part questions the relationship between the inequalities noted and young people's access to the Internet in the neighborhoods of the city of Saint-Louis.

Access of young people aged 18 to 24 to the Internet within urban households in Saint-Louis

Bringing together access to mobile phones and the Internet, we will make focus on young people's access to the Internet market in Saint-Louis, which allows us to take into account the level of access of young people through the mobile network, Flybox 4G and ADSL, and optical fiber within households.

In the intermediate towns of Senegal such as Saint-Louis, young people's access to the Internet within households is structured around mobile Internet excluding Internet keys concerning the connection through mobile datas, followed by mobile Internet from Internet keys (including boxes) and fixed high-speed Internet (ARTP, 2023). Based on these three indicators, various observations were carried out with 549 households using young people aged 18 to 24. Through the datas, we note that 94.89%

of urban young people use mobile datas to connect to the Internet within urban homes in Saint-Louis (**Figure 1**). Among this proportion, 42.80% of them use both Flybox 4G or ADSL (commonly called wifi by young people) and mobile data to access the Internet. A strategy strongly mobilized within working-class households (Pikine, Guet Ndar et Goxu Mbacc) to remedy Internet access problems (**Figure 2**). For ID (president of Goxu Mbacc neighborhood council):

> *The combination or coexistence of Internet access channels explains the high demand among populations for this service. It has become essential in carrying out our various socio-professional tasks. As a local elected official, I regularly receive requests through different digital means, mainly by WhatsApp or by e-mail, to intervene in and outside the neighborhood (Goxu Mbacc) in order to provide my support to the populations, in particular to young people. When my box doesn't allow me to connect to the Internet, I use mobile datas to respond to requests. This is currently the case, you can see it yourself (...) Laugh, I am connected to the 4G box, but I cannot connect to it. This forces me to activate my mobile data. I reported the situation to Sonatel, which deployed its agents several times in the neighborhood, but until now, nothing has been done.*

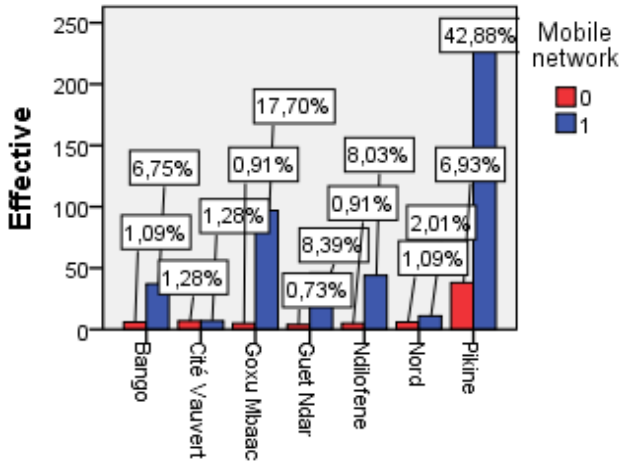

Figure 1. Level of internet access via the mobile network.

Source: Survey data, Digisen_Saint-Louis 2024 project.

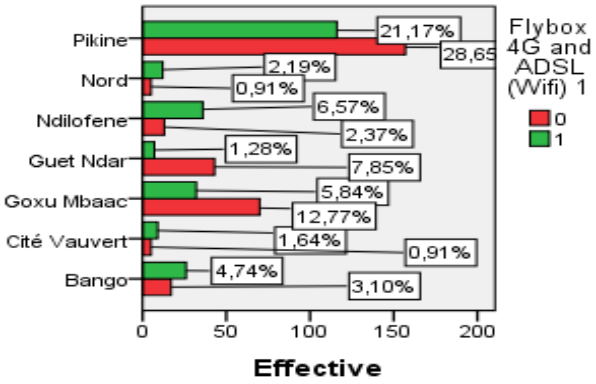

Figure 2. Level of Internet access via Flybox 4G and ADSL within urban households.

Source: Survey data. Diaisen Saint-Louis 2024 project.

Indeed, the analysis of the comments reveals two constraints, namely accessibility linked to equipment making it possible to strengthen Internet coverage of the neighborhood, taking into account the demographic variable, but also to the adaptability associated with the relationship between customer demand and prepaid Internet offers marketed by operators, in this case Sonatel. This is precisely the case with Flybox 4G, which is strongly denounced by households located in working-class neighborhoods.

Furthermore, the proportion of households that connect to the Internet through optical fiber still remains very low, representing overall 5.1% of households surveyed both in residential and popular peripheral areas (**Figure 3**). However, this is the way to develop the population's needs for broadband connections.

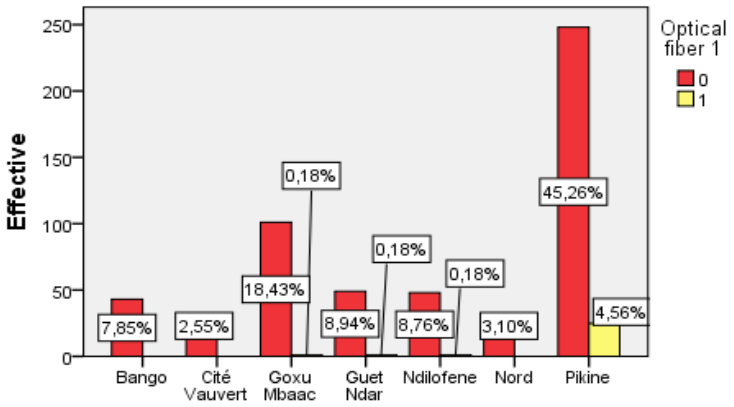

Figure 3. Level of Internet access via optical fiber within urban households.
Source: Survey data, Digisen_Saint-Louis 2024 project.

This is explained by the financial means (it takes between 15,000 and 30,000 dollars to install a kilometer of fiber optic cable) required for the development of these infrastructures which present themselves as one of the solutions to reduce increasingly acute inequalities. due to the movement linked to mobile technologies, requiring an BB and UBB connection. In this regard, we can cite the example of the private technology company CSquared (2013), which has installed more than 3000 km of optical fiber and connected more than 25 internet service providers and mobile network operators in seven urban areas in Ghana, Liberia and Uganda thanks to private support. According to the director of Csquared, «*creating fiber optic and broadband infrastructure in Africa requires patient capital. Without the long-term investments of IFC, Google Inc., Convergence Partners and Mitsui & Co, we would not be able to pull so many kilometers of cable* » (IFC, 2019). Inspired by this model to remedy the digital divide in the intermediate cities, The State of Senegal could strengthen the actors responsible for the distribution of digital services, while promoting public investments on infrastructures which territorialize implementation of digital policies in question in the country's cities.

The analysis of the data through the approach of the real access of young people to technological materials and the Internet calls into question the general trends captured by the global approach of population access to the Internet in Senegal. In the same way, it also highlights the contradictions between the public measures announced by SN2025 and the actions aimed at strengthening territorial digital coverage by

fighting against digital inequalities observed in and between neighborhoods in Saint-Louis.

3.1. Access of young people to digital services through Internet offers within urban neighborhoods in Saint-Louis

As in all intermediate cities in Senegal, mobile operators responsible for providing Internet services to users are distributed unevenly. The establishment of Sonatel/Orange is explained by its seniority, as well as its considerable investments in infrastructure and telecommunications equipment. The level of implementation and access to services at the scale of urban neighborhoods in Saint-Louis will be presented in this part of the analysis.

Young people's access to digital networks takes into account both access to the Internet and to mobile phones. Indeed, we will place much greater emphasis on young people's access to the Internet within the households surveyed.

On the one hand, we have public authorities responsible for sector regulation, and on the other, mobile operators responsible for commercializing digital services. This study aimed to determine factors related to access to digital services and the implications of usage by surveying young people on their digital access. According to the datas presented in these histograms, no urban neighborhood in Saint-Louis has full coverage by any mobile operator, with coverage exceeding 50%. The distribution of youth access to digital services by operator is significant, as analyzed at the household and neighborhood levels. Specifically, the proportions of young people accessing digital services provided by each operator are as follows: 7.83% of the surveyed sample (549 young people aged 18 to 24) access services through Orange (**Figure 4**), 10.9% (**Figure 5**) through Free, 23.7% through Expresso (**Figure 6**), and 7.3% through Pro Mobile (**Figure 7**).

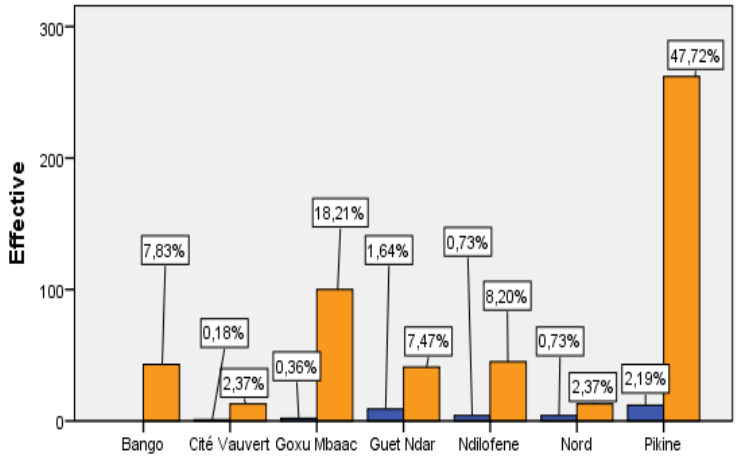

Figure 4. Level of access to mobile internet by the operator Sonatel/Orange at the household and neighborhood level.

Source: Survey data, Digisen_Saint-Louis 2024 project.

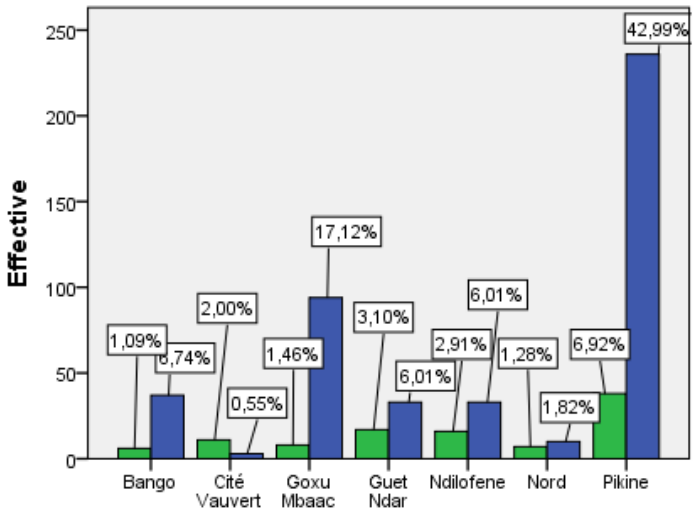

Figure 5. Level of access to mobile internet by the Free/Tigo operator at household and neighborhood level.

Source: Survey data, Digisen_Saint-Louis 2024 project.

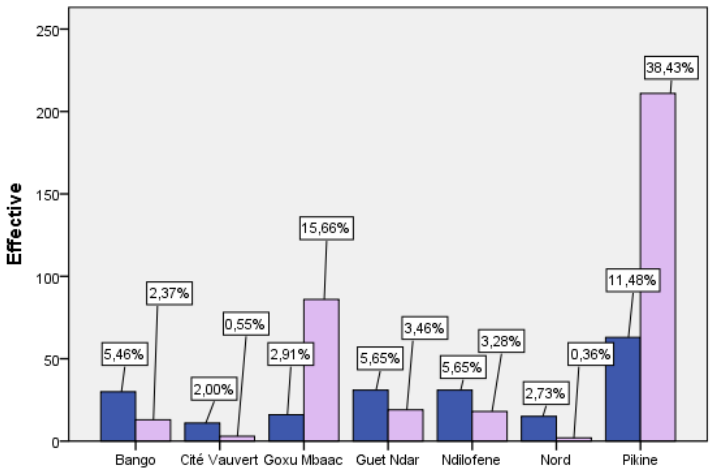

Figure 6. Level of access to mobile internet by the Expresso operator at household and neighborhood level.

Source: Survey data, Digisen_Saint-Louis 2024 project.

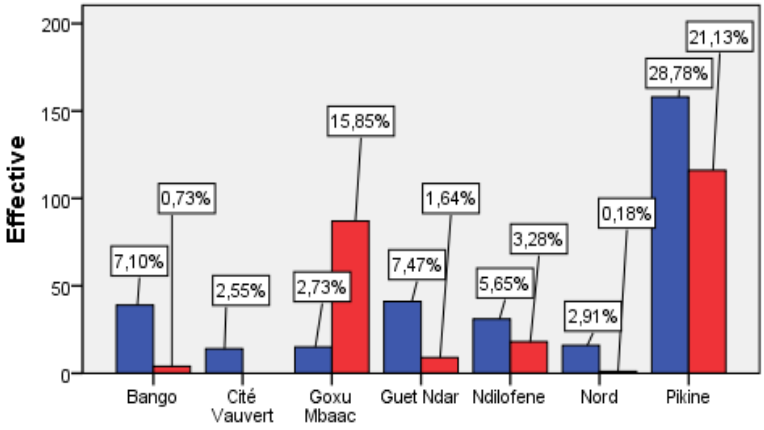

Figure 7. Level of access to mobile internet by the Promobile operator at the household and neighborhood level.

Source: Survey data, Digisen_Saint-Louis 2024 project.

In Cité Vauvert, 23.7% of young people connect through Orange, 5.5% through Free, and Expresso, with no coverage by Pro Mobile.

In Goxu Mbacc, 18.21% of youth have access to the Internet through Orange, one of the most established providers in Saint-Louis in terms of services and infrastructure deployed, while 17.12% connect through Free. However, 15.66% access digital services through Expresso, and 15.83% through Pro Mobile.

In Guet Ndar, 7.47% of young people have access to digital services through Orange, 6.1% through Free, 3.46% through Expresso, and 1.67% through Pro Mobile.

In Ndiolofène, 8.20% of surveyed youth have access to services through Orange, 0.6% through Free, 3.28% through Expresso, and 3.28% through Pro Mobile.

On Île Nord, only 2.27% have access to digital services through Orange, followed by 1.82% through Free, 0.36% through Expresso, and 0.18% through Pro Mobile.

Regarding the Pikine neighborhood, representing the urban area with the highest youth population density in Saint-Louis, 47.72% of young people access digital services at the household level through Orange, followed by 42.99% through Free, 38.43% through Expresso, and 21.13% through Pro Mobile.

The differences noted in the numbers of young people surveyed depending on the urban neighborhoods investigated are linked with the demographic configuration of the populations gathered within households and the accessibility of prepaid digital services from mobile operators according to local stakeholders. For demographic dynamics, we found that it is both denser in urban neighborhoods and households than in neighborhoods and households located in the residential and peripheral area.

This human concentration in the districts of Pikine and Goxu Mbacc is explained by the polarization of fishing activity which constitutes one of the main economic activities, ahead of tourism in the city of Saint-Louis. Likewise, these gaps linked to young people's access to digital technology also relate to affordability, depending on the costs of services and the quality of services. By explaining the constraints linked to young people's access to digital technology at the neighborhood level and the digital divide, this triptych of accessibility, affordability and adaptability must be combined and operationalized concomitantly in strategies and actions depending on the territories to better take into account the needs of populations in connection and reduce digital inequalities. For clarification, digital inequalities from a sociological perspective are understood in the sense of Collin (2021) and Granjon et al. (2009) as a notable difference in the distribution of digital infrastructure and equipment, of which certain individuals or social groups directly suffer the negative consequences. This difference is socially produced and leads to a hierarchy of positions within social spaces (neighborhoods, sub-neighborhoods and households) in the city of Saint-Louis. We can therefore talk about digital social inequalities.

3.2. Relationships to digital inequalities in the neighborhoods of Saint-Louis

Several factors serve to explain as indicators to the inequalities in access of young people to the Internet in the city of Saint-Louis. We can note, among other things, household income, the level of development relating to urbanization, but also the unequal distribution of digital equipment available in the neighborhoods investigated.

To make improvement, we will present the table of monthly income of urban households explored in Saint-Louis.

Table 2. Overview of monthly household income by urban neighborhood of Saint-Louis.

	Effective		**1000.000 à 150.000 Cfa**	**150.000 à 200.000 Cfa**	**200.000 à 250.000 Cfa**	**250.000 à 300.000**	**300.000 à 350.000 Cfa**	**350.000 à 400.000 Cfa**	**400.000 à 450.000 Cfa**	**450.000 à 500.000 Cfa**	**50.000 à 100.000 Cfa**	**Less than 50.000 Cfa**	**Total**
Neighborhood	Bango	11	11	10	6	1	0	0	0	0	1	2	43
	Cité Vauvert	0	1	0	1	1	0	1	0	0	0	5	14
	Goxu Mbacc	9	4	10	10	11	4	4	3	4	6	20	102
	Guet Ndar	0	11	12	15	8	0	0	1	0	3	0	50
	Ndiolofène	0	6	6	4	4	4	3	0	3	12	5	49
	Ile Nord	1	2	1	1	0	2	0	0	5	0	3	17
	Pikine	14	15	25	39	20	26	26	30	16	27	11	274
Total		35	50	64	76	45	36	34	34	28	49	46	549

Source: survey data, Digisen_Saint-Louis 2024 project.

The **Table 2** presents datas concerning the distribution of households surveyed in urban neighborhoods (residential, peripheral and working-class) of Saint-Louis. According to these datas, the households surveyed are mainly located in the peripheral and working-class neighborhoods (Goxu Mbacc, Guet Ndar and Pikine), while residential households (Île Nord, Ndiolofene, Cité Vauvert and Bongo) represent 22.43% of the total. In this way, the analysis of the distribution of households surveyed highlights those with the lowest incomes in the peripheral and working-class neighborhoods. With this in mind, it is observed that 86% of households with less than 50,000 FCFA were distributed between Goxu Mbacc and Pikine. However, 93% of households with a monthly income between 50,000 and 100,000 FCFA live in the districts of Guet Ndar, Pikine and Goxu Mbacc, while only 7% live in residential areas.

In addition to these main trends, the highest population growth rates in the urban neighborhoods of Saint-Louis are observed in its three peripheral and popular neighborhoods (Pikine, Guet Ndar and Goxu Mbacc). Within these 03 neighborhoods are concentrated 78% of the 549 households surveyed, representing our sample (see **Table 1**).

Indeed, local elected officials simultaneously use demographic growth and low household income to explain the digital social divide due to insufficient infrastructure and equipment. It is in this direction that A.D's remarks follow:

> *It is possible to access the Internet during the day, but it is more efficient in the evening and at night, outside the fishing season when the area is less busy. However, during the opening of the fishing season, we have much more restricted access. It is a bit difficult to connect during the day as all traders and buyers use the internet via social media (mainly WhatsApp and Facebook) to monitor fish prices and report the arrival of canoes to other customers. It happens frequently*

and often during the day, during the period of intensification of economic fishing activities, that the Internet is saturated. It is very difficult to access YouTube and make calls via WhatsApp. (Deputy to the president of the Guet Ndar neighborhood counci).

In this same vein, the president of the I.D neighborhood council of Goxu Mbacc mentions that "he buys a pass in his Flybox 04 G, without logging in for weeks" This implies that, in addition to the low income associated with periodic activities (fishing, tourism and agricultural work) practiced by household members, the lack of infrastructure and equipment observed, it is crucial, according to this elected official, to question the relationship between the digital service offered by operators and customer demand, which could be reformulated through the concept of adaptability.

3.3. Inequalities relating to adaptability

Table 3. Central tendency indicators.

Monthly spending of urban bouseholds on internet purchases in Saint-Louis		
	Valide	**507**
N	**Manquant**	**42**
Moyenne	16.000	
Médiane	15.000	
Mode	15.000	
Percentiles 25	10.000	
50	15.000	
75	20.000	

Table 4. Central tendency indicators.

Monthly spending of young people with an income-generating activity on the purchage of mobile Internet passes		
	Valide	**540**
N	**Manquant**	**9**
Moyenne		5769.61
Médiane		4000
Mode		2000
Percentiles	25	2000
	50	4000
	75	8000

Source: Survey data, Digisen_Saint-Louis 2024 project.

The analysis of monthly Internet expenses of the households surveyed (**Table 1**) in relation to the economic value system immediately highlights an important fact, namely the instability of income. This phenomenon is due to the seasonality of activities such as fishing, tourism and agriculture. In fact, household income is made up of the contribution of members having an income-generating activity. Likewise, it changes depending on the periods and opportunities and makes it possible to pay the monthly Internet bill, the average per household is 16,000 FCFA, with a median below

15,000 FCFA per month (**Table 3**). Apart from these indicators, we note that the majority of households in both residential and peripheral neighborhoods spend 10,000 FCFA per month to access the Internet while the majority of young people aged 18 to 24, with an economic income, spend on average 5769 FCFA to access the Internet via mobile data with a median below 4000 FCFA per month (**Table 4**). In addition to the indicators of central tendencies, relating to household and youth expenditure, we observe an irregularity linked to the income of 86% of households with less than 50,000 FCFA and the 93% with an income between 50,000 to 100,000 FCFA. This shows that the instability of household income affects their access to the Internet. In this sense, A.B, representative of the Pro-mobile operator in Saint-Louis, underlines:

> *The pro-mobile operator provides a public service, unlike traditional operators responsible for strengthening digital infrastructures based on licenses and commitments made with public authorities. In reality, people's access to mobile Internet in neighborhoods is relative to their purchasing power. If operators are much more present in Dakar in terms of coverage than in intermediate cities like Saint-Louis, it is because demand is much stronger and more profitable. And the Internet market is much more profitable in Dakar than Saint-Louis in terms of investment for operators.*

This is explained by the very weak business climate which prevails around digital professions in the century-old city, with almost no companies having capital that can invest in the development of cable internet. As one of the solutions to remedy inequalities in young people's access to high-speed Internet, the State of Senegal must, according to small and medium-sized businesses and civil society, invest in universal service to develop digital inclusion. This will allow young people from different neighborhoods and from various social origins to access high-speed Internet at an affordable cost, but also to digital professions (digital communication, e-commerce, telecom, etc.) in intermediate cities, like Saint-Louis. In this sense, the director of PME Senegal Academy tells us:

> *The solution to overcoming income inequalities cannot either come from the pockets of young people, households, nor small and medium-sized businesses who suffer all the effects of the consequences of the digital divide, linked to public investments that the authorities must support in order to allow all populations to access digital services throughout the territory. AD.*

According to the words of this young entrepreneur, it is obvious that the solution to reducing digital inequalities can only be political. Indeed, the creation of a digital ecosystem requires accessibility, which implies the coverage of intermediate cities by infrastructure allowing access to BB and UBB connection. Then, it is necessary to have affordability in relation with costs, and finally, it is imperative to have adaptability which implies the responsibility of the public authorities responsible for controlling the effectiveness of the services offered by the promoters of the internet market in secondary towns.

3.4. Relationship of digital inequalities to equipment and urban planning

The analysis of the disparity in digital infrastructure and equipment linked to the development of neighborhoods in Saint-Louis makes it possible to determine the place

of urban governance in the inequalities of young people's access to digital technology in intermediate cities in Senegal.

Information concerning young people's perception of their neighborhoods' access to digital infrastructure and equipment reveals three distinct categories of neighborhoods. Firstly, see **Figure 8**, the less equipped and therefore less covered areas, which represent 14.39% of the households surveyed. Subsequently, poorly equipped neighborhoods, which represent 56.28% of the households surveyed. The remaining households, which represent 29.14%, are located in the best equipped areas, that is to say the residential neighborhoods of Saint Louis. Indeed, the analysis of datas at the scale of urban neighborhoods makes it possible to establish that the distribution of equipment relating to neighborhood coverage of digital networks is not homogeneous. This observation can be explained when we question urban governance in the city of Saint-Louis by two factors: the discontinuity of the development of urban neighborhoods and its consequences linked to the disparity of infrastructure. This is the situation presented in **Figure 9** where we note in the neighborhoods areas that are well planned, well-off and spontaneous at the same time.

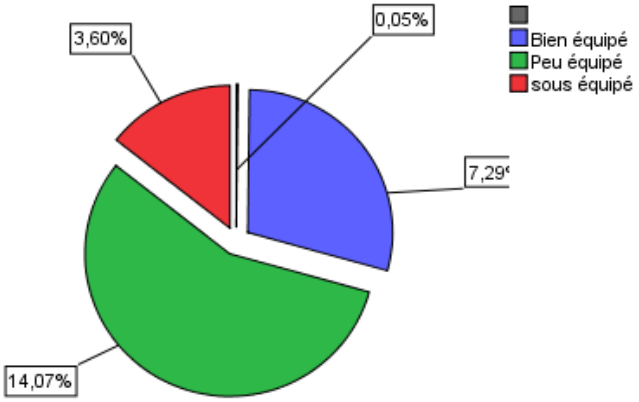

Figure 8. Relationship between the level of equipment in urban neighborhoods and inequalities in Internet access in Saint-Louis.
Source: Survey data, Digisen_Saint-Louis 2024 project.

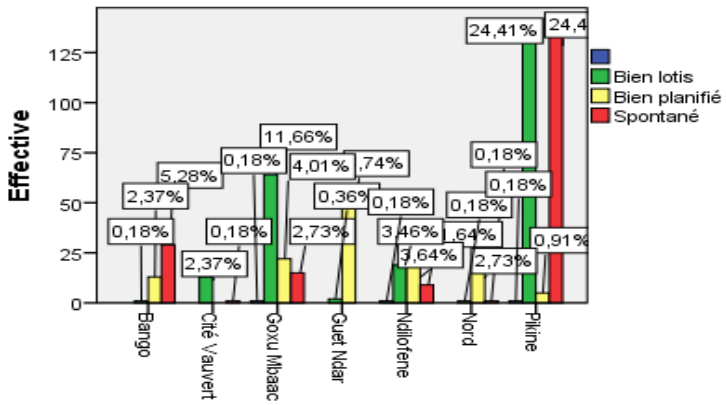

Figure 9. Young people's perspective on the level of development of urban neighborhoods in Saint-Louis.
Source: Survey data, Digisen_Saint-Louis 2024 project.

In this regard, urban governance presents itself as the second dependent variable, explaining inequalities in young people's access to the Internet, apart from household and young people's income in the urban neighborhoods of Saint-Louis. In this sense, it explains the major constraints linked to digital development that must be taken into account in action relating to the deployment of digital policies in secondary cities in Senegal. Indeed, «*these difficulties are linked to anarchic occupations, transforming all space into housing to the detriment of networks carrying vital services such as the Internet in peripheral neighborhoods like Goxu Mbacc* » according to I. D, president of the Saint-Louis neighborhood councils. In addition, M.F, president of the Pikine 3 neighborhood council, tells us for his part that:

> *The populations furthest from the entrance to Pikine 3 cannot connect to their residence. As a result, they are forced to move their phones closer to Pikine 1 and 2 to connect to the internet. This explains why foreign tenants leave the neighborhood after one to two months.*

The phenomenon indicated by these authorities is confirmed both by local authorities and young people from working-class neighborhoods (Pikine, Goxu Mbacc, Guet Ndar) and peripheral neighborhoods (Bango) unlike the authorities from residential neighborhoods (Cité Vauvert, Île Nord, Ndiolofène).Thus, urban governance problems linked to the digital development of working-class and peripheral neighborhoods must be taken into account by digital public policies to reduce inequalities in access to the internet in Saint-Louis and in intermediate cities in Senegal.

4. Discussion

Despite providing valuable information on the state of youth access to digital networks and the digital public policies established by development policymakers—namely the Ministry of Digital and Telecommunications and regulatory agencies such as the ARTP—this contribution seeks to grasp the inequalities in youth access to digital networks in secondary cities in Senegal. Given its geographic position and the colonial legacy tied to the establishment and development of telephony, coupled with the investments made by the State since the 1960s, Senegal has managed to establish itself in the digital realm within Africa. However, the global approach, which differentiates well-connected from poorly-connected countries, conceals various paradoxes and contradictions within the city of Saint-Louis. Most young people in households access the Internet through medium-speed mobile datas in a country considered one of the best connected in West Africa, with five submarine fiber optic cables. This raises concerns about access to telecommunications networks and services, and to ICTs as a whole, as highlighted by Olivier Sagna (2006) in his efforts to address the digital divide in Africa.

Regarding the public digital policies that guide actions and strategies to strengthen national digital network coverage, these policies remain consistent with the development of cable connectivity (broadband and ultra-broadband) and the universal service framework, which has enabled the diversification of operators in Senegal. However, these actions have not had significant effects at the secondary city level. For example, we can cite the lack of effective digital services in neighborhoods, the

absence of digital ecosystems capable of boosting the local economy, and the limited deployment of cable Internet, which is highly demanded by SMEs in Saint-Louis. According to a local digital service provider representative in Saint-Louis, "The non-profitability of the necessary investments for deploying digital infrastructure and equipment to strengthen network coverage in Saint-Louis explains the gap and the resulting digital inequalities.

Observations on the level of youth access (aged 18 to 24) in Saint-Louis have enabled the identification of various inequalities resulting from disparities in available digital infrastructure and equipment. At the neighborhood level, these inequalities are linked to both household income and, in some cases, the geographic location of households. It was noted that more than half of young people connect within households and neighborhoods through medium-speed mobile Internet (2G, 3G, and 4G) and that the service is even inaccessible in some sub-neighborhoods. Consequently, several community initiatives have been developed by young people to make Internet access universal within and between neighborhoods to combat social digital inequalities (Collin et al., 2021). This is precisely the context for the initiative "SAMA GOXX SAMA YITE" (translated as "My Neighborhood, My Priority"). This concept, created and implemented by young people, aims to reduce digital inequalities (DiMaggio et al., 2004) related to income, the geographic location of households, and urban governance. Using suitable equipment such as Flybox routers and satellite antennas, young people, through the treasury of the sports and cultural association *Deggo* (which means understanding in Wolof) and private donors, have enabled 10 neighborhoods to gain access to the Internet. The concept coordinator explains that "this model is a means of involving young people in digital governance, helping to bridge the digital divide by ensuring digital inclusion of the population, particularly young people, within and between neighborhoods in Saint-Louis" (C.N.).

Moreover, in the same vein, there is a trend of creating mini connected spaces using a 4G Flybox through youth contributions of 1500 FCFA ($2.55) per month in popular neighborhoods to mitigate, according to them, the high cost of mobile Internet connectivity. The statement by a person in charge of collecting contributions for a mini connected space in Guet Ndar is illustrative of the logic and rationale driving these collective actions developed by young urban residents in popular neighborhoods in Saint-Louis. A.S. explains:

> *"In the absence of any developed and connected space for young people in Guet Ndar, and given the high monthly cost of mobile Internet packages, the initiative 'DIAPALANTE CONNECTE' (translated as 'Supporting Each Other to Stay Connected') allows young members to access the Internet for 30 days in exchange for a 1,500 FCFA ($2.55) contribution. In contrast, this amount could multiply by four or six times per month when purchasing mobile Internet packages from mobile operators."*.

The examination of these collective actions undertaken by young people in neighborhoods to improve their Internet access reveals that they all aim to democratize Internet access for all social groups based on income and environment. In this respect, they highlight the importance and role of this service in carrying out daily tasks for young people. According to A.B., *"Access to the Internet should contribute to*

reducing inequalities rather than exacerbating them, especially since it is used by everyone, from games to work, by both educated and uneducated youth".

Beyond these burgeoning initiatives in the urban neighborhoods of Saint-Louis, the Senegalese government also implemented the SN2025 and reformed the regulatory framework to promote digital development. These measures have led to significant actions, such as the deployment of infrastructure capable of supporting population needs, the democratization of smartphones to all income groups, and the digital tools revolution widely adopted by the population, especially young urban residents. To achieve these goals, the State developed the National Broadband and Ultra-Broadband Plan in 2018 to meet the population's needs for high-speed connectivity.

At the city level in Saint-Louis, the SN2025 and related measures established by digital development policymakers aimed to create conditions for the establishment of "Smart Ndar City 2025", a project launched in June 2018 that was supposed to transform Saint-Louis into a digital region and a smart city by 2025. By the end of the project deadline, however, the first two axes—namely improving digital services for citizens and digital urban planning—remain pending in the urban area of the Saint-Louis municipality. As for the broadband and ultra-broadband plan launched in 2018 to reinforce digital inclusion and extend telecommunications network coverage at the national level, its results remain inconclusive. Only 51% of young people connect to the Internet via high-speed ADSL, which is largely due to the very low penetration of fiber optics in the neighborhoods surveyed in Saint-Louis.

5. Conclusion

The analysis of empirical datas regarding access to and use of the Internet by young urban dwellers aged 18 to 24, in connection with digital public policies in the neighborhoods of Saint-Louis, has shed light on digital inequalities. The highlighted approach draws on both urban sociology and explanatory methods, thereby illuminating the strategies and actions meant to address the digital divide in Saint-Louis' urban neighborhoods. As a possible solution, it suggests the promotion of a universal digital service by neighborhood, based on the type of infrastructure and level of urbanization. In this regard, A. D. *points out the need to leverage public investments to fund cable connection coverage by neighborhood, allowing young people to transition from primary to professional digital use*. Thus, public intervention and international mechanisms must be mobilized to address inequalities related to young people's access to the Internet at home and in neighborhoods, making the universal digital service by neighborhood achievable while considering the level of infrastructure and urbanization in these areas. According to A. D., *public funds must be mobilized to finance neighborhood-specific cable connections, enabling young people to move from basic to more complex digital usage*. In perspective, the study questions the uses and connection needs of the 94.99% of young people aged 18 to 24 who connect via mobile Internet and the 5.1% who use ADSL and fiber optics for connectivity.

Author contributions: Conceptualization, DSA; methodology, DSA; software, DSA; validation, CSW, JC, MD and MLN; formal analysis, DSA, CSW, JC and JCBM;

investigation, DSA, TPM, DS, MRS and DM; resources, DSA; data curation, DSA, DS, TPM and PDR; writing—original draft preparation, DSA; writing—review and editing, DSA; visualization, DSA and CSW; supervision, DSA, CSW, PDR and JCBM; project administration, JC, PDR and JCBM; funding acquisition, JC, CSW, MD and MLN. All authors have read and agreed to the published version of the manuscript.

Acknowledgments: We would like to thank the Botnar Foundation (www.fondationbotnar.org) for funding the Digital Policy Research, Infrastructure Development and Youth Participation project in Saint-Louis and Ziguinchor (DigiSen), which made it possible to carry out this work.

Conflict of interest: The authors declare no conflict of interest.

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